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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,407	06/26/2006	Paul Joseph Brooks	1033963-000026	9864

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BUCHANAN, INGERSOLL & ROONEY PC
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER	
KHATRI, PRASHANT J	

ART UNIT	PAPER NUMBER
1794	

NOTIFICATION DATE	DELIVERY MODE
12/28/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No.	Applicant(s)	
	10/584,407	BROOKS, PAUL JOSEPH	
	Examiner	Art Unit	
	PRASHANT J. KHATRI	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,6-11 and 14-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,6-11 and 14-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

In response to Amendments/Arguments filed 8/31/2009. Claims 1, 4, 6-11, and 14-20 are pending. Claim 1 was amended. Claim 5 was cancelled.

Request for Information

1. Applicant and the assignee of this application are requested under to provide the following information that the examiner has determined is reasonably necessary to the examination of this application. While it is noted that the Product Sheet for 3M Radiant Mirror Film VM2000F1A6 was cited as relevant art by the Applicant, the circumstances surrounding its generation are unclear. Was the document published per se, or merely for internal use? If published, what was the date of publication?

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 4, 6-11, and 14-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 recites the limitation “high and low refractive index non-metallic layers”. It is not clear what would be considered a high refractive index or low refractive index for the film stack. Further, Claim 1 recites the limitations of “high absorbency and

emissive characteristics", "low absorbency characteristics", and "high transmissive characteristics". It is not clear what would be considered high or low in regards to the above material characteristics.

5. Concerning claims 7-8, it is noted that silicon oxide, silicon oxynitride, and silicon nitride are considered to be metalloids or semi-metallic materials. Examiner notes that Applicant has recited in claim 1 that the thermal control film is to be "metal free" which contains non-metallic layers. Given that Applicant has argued that metalloids or semi-metallic materials are considered to be metal-based, it is not clear how the thermal control film would remain metal free if silicon nitrides and silicon oxides are substituted. Clarification is requested.

6. Further, claims 14-20 are rejected as they are dependent upon cancelled claims 3 and 13. Given that it is not clear as to the proper claim dependency for the claims, claims 14-20 which are duplicates of claims 4 and 6-11 are not examined. Claims 4 and 6-11, however, will be examined. Appropriate correction is requested.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 4, 6, and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jonza et al. (***US 5882774***) with evidence from 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (***Hereafter "Product Sheet"***).

9. Jonza et al. disclose a multilayer optical film (***abstract***). Concerning claims 1, 4, and 6 Jonza et al. disclose the multilayer optical film allows for construction of mirrors and polarizers wherein said multilayer optical film are comprised of alternating layers of PEN and coPEN wherein the PEN and coPEN for example, and have different refractive indices (***FIG. 1b; col. 2 bridged to 3, lines 63+; col. 5, lines 28+; col. 10-12, lines 31+***). Examiner notes that the desired refractive index relation ships can be established by combining a first material that is crystalline or semi-crystalline with a second material that is crystalline, semi-crystalline, or amorphous by stretching during or after film formation, extruding, or coating (***col. 16-17, lines 39+***). Jonza further discloses that optical properties such as reflectance and polarization vary depending upon the stretching as the stretching goes from uniaxial to biaxial stretching (***col. 3, lines 1+; col. 5, lines 28+; col. 10-12, lines 31+***). Specifically, it is noted that Jonza discloses stretch rate, stretch ratio, and stretch temperature are among the variables that one of ordinary skill in the art could adjust to form the desired optical properties (***col. 18, lines 1+***).

Regarding claim 4, it is noted that since the material as disclosed by Jonza is comprised of the materials as presently claimed in claim 1 (i.e. alternating high/low refractive indices non-metallic layers), the material would be intrinsically flexible. Concerning claims 9-10, Examiner notes that optical properties are known within the art to be strongly influenced by optical thicknesses which is a parameter based upon the

physical thickness of each layer. Given the above disclosure, one of ordinary skill in the art by routine experimentation would be able to determine the thickness of the total stack depending upon the desired optical characteristics. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skill in the art to form the appropriate thickness depending upon the desired optical properties. As evidence by the Product Sheet which discloses a mirror film that is comprised of a film that is similar to that used in the present invention and in Jonza and has wavelength transmission in the near wavelength range as that used in the present invention and an optical reflectivity in the visible light above 95% (***Table***). The mirror film is metal free and thus is non-corroding and non-conductive (***Table***). While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding the limitation “active spacecraft antenna metal free thermal control film", the Examiner considers the phrase to be a statement of intended use and as such is rejected thusly. The phrase “active spacecraft antenna metal free thermal control film” is considered a statement of intended use. The intended use of the claimed invention must result in a structural difference between the claimed invention and the

prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Because the laminate of Jonza et al. and the Product Sheet is not structurally different from the interference film as claimed by Applicant, the interference filter as claimed does not provide patentable distinction over the prior art of record.

10. All of the elements were known within the art. The only difference is a single disclosure containing all of the presently claimed elements. Jonza et al. disclose a multilayer optical film that can be used in constructing mirrors containing only polymeric material. The mirrors are formed by varying the stretch ratio (i.e. uniaxial stretching to biaxial stretching), set temperatures, and other known parameters to form the desired optical performance properties. However, Jonza et al. are silent to the characteristics as claimed in claim 1. The Product Sheet discloses a mirror film that is comprised of a film that is similar to that used in the present invention and has wavelength transmission in the near wavelength range as that used in the present invention and an optical reflectivity in the visible light above 95%. While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material

properties depending upon the application. Further, it is noted that such a mirror film is metal free and thus, will not corrode in corrosive environments.

11. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jonza et al. (***US 5882774***) with evidence from 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (***Hereafter "Product Sheet"***) in view of Iacovangelo et al. (***US 6587263***).

12. Jonza et al. and the Product Sheet disclose the above. However, Jonza et al. and the Product Sheet are silent to the use of silicon oxide, silicon oxynitrides, and silicon nitrides and such articles are in the form of tiles.

13. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer (***abstract***). Concerning claims 7-8, Iacovangelo et al. disclose the radiative layer is comprised of silicon oxide, silicon nitride, and silicon oxynitride in which the refractive index profile can be modulated to control the amplitude, bandwidth, and wavelength of the rejection bands (***abstract; col. 2, lines 35+***). As shown by Iacovangelo, the radiative layer allows for improved emissivity and absorbency in wavelengths from 200 nm to 2500 nm and far infrared regions (***col. 2, lines 42+***). Regarding the limitation of a plurality of tiles, Iacovangelo et al. disclose the radiative layer is deposited to plates having a reflective layer used in spacecrafts (***col. 4, lines 50+***). The radiative layer comprising such materials allows for improved interfacial CTE matching during thermal cycling, improved optical performance at different wavelengths, and thermal properties (***col. 2, lines 35+***).

14. All of the elements were known within the art. The only difference is a single disclosure containing all of the presently claimed elements. Jonza et al. and the Product Sheet disclose the above. However, Jonza et al. and the Product Sheet are silent to the use of silicon oxide, silicon oxynitrides, and silicon nitrides and such articles are in the form of tiles. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer. Given that Iacovangelo et al. disclose the radiative layer comprising silicon oxide, silicon nitride, and silicon oxynitride has improved optical performance in certain wavelengths during thermal cycling, it would have been obvious to one of ordinary skill in the art to use the materials of Iacovangelo et al. in order to improve optical performance in the desired wavelengths.

15. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jonza et al. (***US 5882774***) with evidence from the 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (***Hereafter "Product Sheet"***) in view of Lepore et al. (***US 5373305***).

16. Jonza et al. and the Product Sheet disclose the above. However, Jonza et al. and the Product Sheet are silent to placing such a structure onto an active face for an antenna.

17. Regarding Claim 11, Lepore teaches that the control film is applied to a spacecraft antenna operating in the 12-14 GHz frequency band, and thus the active face of an antenna carried by the spacecraft and likewise teaches an antenna comprising a thermal control film that has black polyimide dielectric films (labeled

elements 510, 520, and 530) bonded with glass fiber reinforcement mesh films between (labeled elements 514, 524, 534), quartz fiber mats (516, 518, 526, 528) to provide increased radiation isolation, and a single germanium coating layer (labeled element 512, on the space facing surface of film 510):

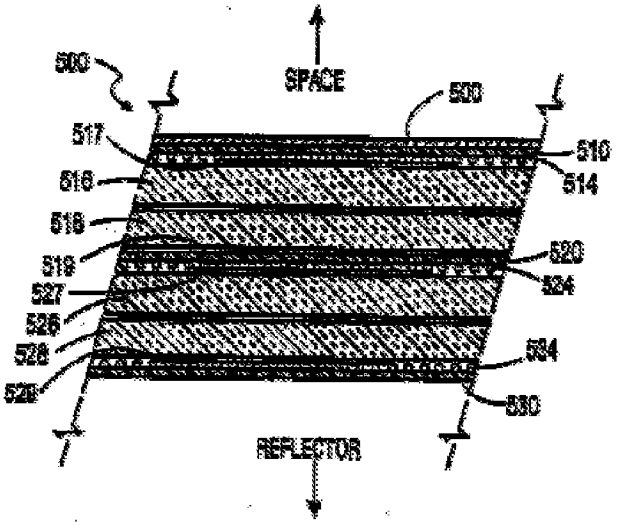

FIG. 5

Lepore teaches that black polyimide minimizes transmittance and RF transmission losses through the membrane *(**Col 4, lines 58+; Col. 5, lines 1+**)*. The polyimide dielectric films, glass and quartz fiber reinforcement multi-layer stack is considered to thus correspond to a multi-layered filter with alternating high and low refractive indices covering the active face thereof (***Figs. 1-2; Col 7, lines 50-54; Claim 16***).

18. All of the elements were known within the art. The only difference is a single disclosure containing all of the presently claimed elements. Jonza et al. and the Product Sheet disclose the above. However, Jonza et al. and the Product Sheet are silent to placing such a structure onto an active face for an antenna. Regarding Claim

11, Lepore teaches that the control film is applied to a spacecraft antenna. The thermal control film is comprised of layers alternating layers of polyimide layers and glass fiber mats that would intrinsically have different refractive indices. As such, the concept of providing thermal control multilayer film having materials that can control optical performance and as a result the thermal performance in different wavelengths upon a device that transmits in different frequencies is known within the art. Given that the prior art of Jonza et al. and the Product Sheet clearly discloses materials wherein the optical performance of a film stack can be altered by adjusting different parameters that are known within the art, it would have been obvious to one of ordinary skill in the art to apply the resultant structure of Jonza et al. and the Product Sheet as a material to alter the thermal, optical, and signal performance of that of Lepore to result in the presently claimed antenna having a thermal control film.

Response to Arguments

19. Applicant's arguments, see p. 5, filed 8/31/2009, with respect to the 35 USC 112, 2nd paragraph rejection of claim 5 have been fully considered and are persuasive. The rejection of the above claim has been withdrawn. While Examiner acknowledges that claim 5 has been cancelled, the rejection of claims 14-20 under 35 USC 112, 2nd paragraph is still applicable given that the claims are dependent upon cancelled claims and Applicant has not fully addressed the rejection.

20. Applicant's arguments, see p. 5-6, filed 8/31/2009, with respect to the 35 USC 102(b) rejection under Lepore et al. have been fully considered and are persuasive.

The rejection of the above claims has been withdrawn. However, it is noted that Lepore et al. is still applicable as a secondary reference. Examiner would like to note that Applicant asserts that the germanium is a metal-containing material and further discloses the use of silicon oxide, silicon nitride, and silicon oxynitride. Given that silicon and silicon-based materials are considered metalloids, which the Applicant considers to be metal-containing, it is unclear how the resultant structure would remain "metal free" as required by the instant claims.

21. Applicant's arguments, see pp. 7-8, filed 8/31/2009, with respect to the 35 USC 102(b) rejection under Iacovangelo et al. have been fully considered and are persuasive. The rejection of the claims has been withdrawn. However, it is noted that Iacovangelo et al. is still valid as a secondary reference.

22. Applicant's arguments, see pp. 7-9, filed 8/31/2009, with respect to the 35 USC 102(b), 102(f), and 103(a) rejections have been fully considered and are persuasive. The rejection of using the above reference under the above cited passages has been withdrawn. However, the reference is still applicable as an evidentiary reference and is treated as such. Applicant asserts on pp. 7-8 that the claimed invention cannot be reasonably considered as being derived from the 3M Radiant Mirror Film VM 2002, and points to various citations of the present disclosure where Applicant discusses modifications that can be made to the commercially available 3M Films.

Applicant asserts that "the claimed embodiment is a derived use of previously existing 3M material or technology". Further Applicant asserts that the thermal film "comprises" the material which is exemplified by the Product Sheet and the final

properties are achieved by alternating, stretching, cooling, of the material or inserting new layers. Examiner respectfully disagrees and notes that Applicant has provided no working examples and give no guidance as how one would manipulate the multilayer film structure to give the claimed properties, save to specify desirable bandwidth frequency ranges for the film, and have admitted that it is within ordinary skill in the art to adapt commercially available materials to meet such requirements.

Regarding the same reference, Applicant further asserts that the product sheet is "a relatively raw material which in an unprocessed form cannot be used in a space application". Examiner respectfully disagrees and would like to point out that the Product Sheet recites that it is a multilayer polymeric film (***Description paragraph***) and as such, it is not clear how the material is a raw material given that it is already in film form. Further, regarding the assertion that such a material cannot be used in a space application, it is noted that "the arguments of counsel cannot take the place of evidence in the record", *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). It is the examiner's position that the arguments provided by the applicant regarding the general teachings of the Product Sheet are not capable of use in space applications must be supported by a declaration or affidavit. As set forth in MPEP 716.02(g), "the reason for requiring evidence in a declaration or affidavit form is to obtain the assurances that any statements or representations made are correct, as provided by 35 U.S.C. 24 and 18 U.S.C. 1001".

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Russell et al. (***US 6391400***) discloses a thermal control film that is flexible and may be used in glazing applications that is comprised of alternating high and low refractive index materials.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PRASHANT J. KHATRI whose telephone number is (571)270-3470. The examiner can normally be reached on M-F 8:00 A.M.-5:00 P.M. (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571) 272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

PRASHANT J KHATRI
Examiner
Art Unit 1794